

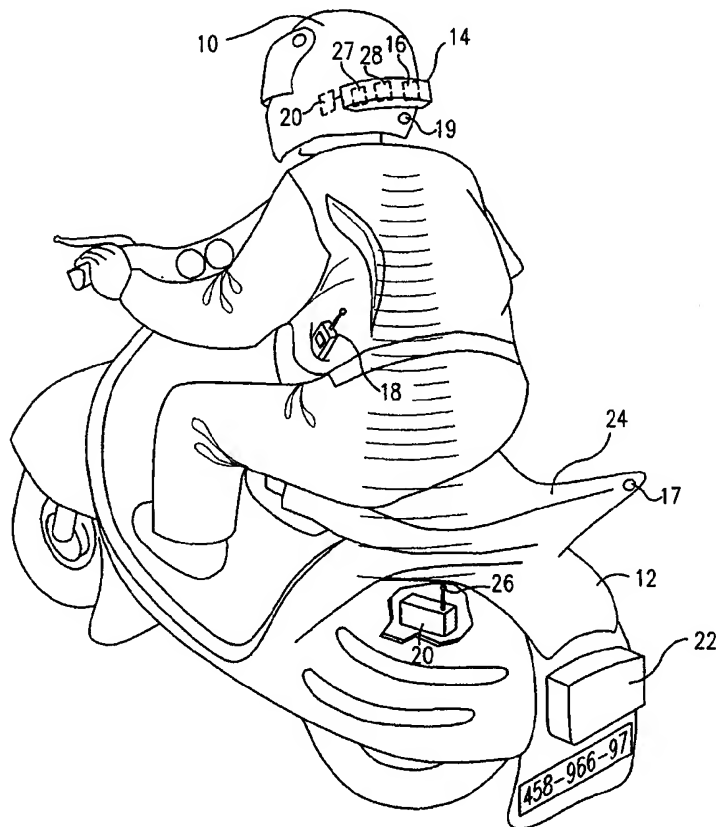


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(21) International Application Number: PCT/IL97/00225 (22) International Filing Date: 3 July 1997 (03.07.97) (30) Priority Data: 120218 13 February 1997 (13.02.97) IL (71) Applicant (for all designated States except US): NOGA NEGEV INNOVATIONS LTD. [IL/IL]; Midreshet Sdeh Boker, 84990 Sdeh Boker (IL). (72) Inventor; and (75) Inventor/Applicant (for US only): BLEICHER, Yoav [IL/IL]; David Israel Street 73/17, 76506 Rehovot (IL). (74) Agents: COLB, Sanford, T. et al.; Sanford T. Colb & Co., P.O. Box 2273, 76122 Rehovot (IL).		(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>

(54) Title: HELMET WITH BRAKE LIGHT**(57) Abstract**

A helmet (10) including an illumination indicator (14) attached thereto and a braking sensor (20) that detects a deceleration of a vehicle (12) independently of illumination of a brake light (22) of the vehicle and activates the illumination indicator upon detection of the deceleration of the vehicle. Preferably the braking sensor includes a transmitter (26) for transmitting an activation signal to the illumination indicator.



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HELMET WITH BRAKE LIGHT

FIELD OF THE INVENTION

The present invention relates generally to helmets for riders of motorcycles, bicycles and the like, and particularly to helmets with brake light illumination indication.

BACKGROUND OF THE INVENTION

Helmets for riders of motorcycles, bicycles and the like, with illumination indication are well known. For example, United States Patent 4,559,516 to Schott et al. describes a helmet with turn signal indicator for a motorcycle rider that includes a pair of turn signal lamps activated by a head tilt switch. The rider can sense if the lamps are lit by means of fiber optics which transmit the illumination of the lamps to the front of the helmet.

United States Patent 4,760,373 to Reilly describes a helmet with a brake light activated by wireless connection to a brake light system of a motorcycle. The helmet brake light is activated by a transmitter in series or parallel connection with the motorcycle brake light.

United States Patent 4,891,736 to Gouda describes a signal helmet with tail, brake and directional indications activated by wired or wireless connection to a brake light system of a motorcycle. The helmet brake light is in series or parallel connection with the motorcycle brake light.

United States Patent 5,040,099 to Harris describes a motorcycle helmet with a brake lamp attached thereto and activated by optic or sonic connection to a brake light system of a motorcycle.

United States Patent 5,207,500 to Rios et al. describes a motorcycle helmet with a plurality of headlights attached thereto and activated by wired or wireless connection to a motorcycle.

United States Patent 5,353,008 to Eikenberry et al. describes a motorcycle helmet with a brake lamp that includes a duty cycled receiver circuit for receiving a radio frequency signal from a transmitter located on a motorcycle.

All of the prior art helmet brake light systems are auxiliary extensions of the existing brake light system of the motorcycle or other vehicle, that is, they are simultaneously illuminated in series or parallel upon illumination of the vehicle brake light system, rather than being directly activated by the deceleration of the vehicle.

SUMMARY OF THE INVENTION

The present invention seeks to provide an improved helmet for riders of vehicles, such as motorcycles, bicycles, snowmobiles and the like, with illumination indication directly activated by the deceleration of the vehicle.

5 There is thus provided in accordance with a preferred embodiment of the present invention, a helmet including an illumination indicator attached thereto and a braking sensor that detects a deceleration of a vehicle independently of illumination of a brake light of the vehicle and activates the illumination indicator upon detection of the deceleration of the vehicle. Preferably the braking sensor includes a transmitter for transmitting an activation
10 signal to the illumination indicator.

 In accordance with a preferred embodiment of the present invention, the braking sensor includes an accelerometer which upon detecting a vehicle deceleration of a predetermined threshold activates the illumination indicator.

 Additionally in accordance with a preferred embodiment of the present
15 invention, the braking sensor includes an electrical current detector which upon detecting a current in the braking electrical wires of the vehicle activates the illumination indicator.

 Further in accordance with a preferred embodiment of the present invention, the braking sensor includes a sensor that senses an abrupt reduction of fuel flow to a motor of the vehicle.

20 Still further in accordance with a preferred embodiment of the present invention, the braking sensor includes a pressure sensor that senses a fluid pressure of brake fluid in a brake line of the vehicle.

 Additionally in accordance with a preferred embodiment of the present invention, the braking sensor includes a sensor that senses a movement of a brake cable that
25 actuates a brake of the vehicle.

 A microprocessor may be provided to process signals emitted by any of the braking sensors. The illumination indicator may be built into the helmet or manufactured as an add-on accessory which may be attached to the helmet, such as by bonding or with an adaptor. The braking sensor may be electrically connected to an electrical system of the vehicle, such as
30 by means of an inductance coil or by jumpers.

 In accordance with a preferred embodiment of the present invention, the helmet may be provided with a system for switching the illumination indicator between an active and a shutdown mode. For example, there may be provided an inertial sensor, such as a piezoelectric

element, which senses movement of the helmet. If no movement of the helmet is detected for a predetermined time, such as 5 minutes, then the illumination indicator is switched to shutdown mode.

Additionally in accordance with a preferred embodiment of the present invention, the helmet includes an audible alarm. This may be useful, for example, as a burglar alarm for preventing theft of the helmet when not in use. Alternatively, the audible alarm may be activated by a remote control signal so as to help locate a lost helmet.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood and appreciated more fully from the following detailed description, taken in conjunction with the drawings in which:

Fig. 1 is a simplified pictorial illustration of a helmet with illumination indication directly activated by the deceleration of a vehicle, constructed and operative in accordance with a preferred embodiment of the present invention;

Fig. 2 is a simplified flow chart of braking sensors used with the helmet of Fig. 1; and

Fig. 3 is a simplified illustration of a sensor that senses an abrupt reduction of fuel flow to a motor of a vehicle, constructed and operative in accordance with a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Reference is now made to Fig. 1 which illustrates a helmet 10 with illumination indication directly activated by the deceleration of a vehicle 12, constructed and operative in accordance with a preferred embodiment of the present invention. Vehicle 12 is illustrated as a motorcycle, but it is appreciated that vehicle 12 may alternatively be any other kind of vehicle that a rider thereof wears a helmet, such as a bicycle, scooter, snowmobile, jeep, skates, roller blades, skateboards, skis and the like.

An illumination indicator 14 is preferably built into helmet 10 or manufactured as an add-on accessory which may be attached to helmet 10, such as by bonding or with an adaptor attached thereto. For safety purposes, the type of attachment used to attach illumination indicator 14 to helmet 10 may be selected so that illumination indicator 14 is sheared from helmet 10 when subjected to a predetermined force. This helps prevent illumination indicator 14 from possibly being driven into helmet 10 towards a rider's skull in the event of a road accident. Alternatively, illumination indicator 14 may be attached to a jacket of a rider instead of helmet 10.

Illumination indicator 14 may include any conventional lighting apparatus, such as an incandescent light bulb or LED, and may provide continuous or intermittent (flashing) illumination. Optionally, illumination indicator 14 may also provide turn signal illumination or hazard illumination indication.

5 In accordance with a preferred embodiment of the present invention, helmet 10 includes an audible alarm 16, most preferably housed in illumination indicator 14. Alarm 16 may be useful, for example, as a burglar alarm for preventing theft of helmet 10 when not in use. Alternatively, alarm 16 may be activated by a remote control signal, such as from a pocket size remote control unit 18, so as to help locate a lost helmet.

10 Optionally, vehicle 12 and helmet 10 may be provided with a pair of transceivers 17 and 19 that may be used for wireless communication therebetween. Transceivers 17 and 19 may be helpful in locating vehicle 12 or helmet 10 in the event of loss or theft.

Preferably a braking sensor 20 is provided that detects a deceleration of vehicle 12 independently of illumination of a brake light 22 of vehicle 12, and activates illumination indicator 14 upon detection of the deceleration of vehicle 12. Preferably braking sensor 20 is mounted on vehicle 12, such as under a seat 24, and includes a transmitter 26 for transmitting an RF activation signal to the illumination indicator 14. Braking sensor 20 may be electrically connected to an electrical system of vehicle 10, or to some other brake system, such as the fluid brake lines, as will be described hereinbelow. Alternatively, braking sensor 20 may be mounted on helmet 10 as described hereinbelow, and may be in wired electrical communication with illumination indicator 14.

25 Helmet 10 may be provided with a system 28 for switching illumination indicator 14 between an active and a shutdown mode. For example, there may be provided an inertial sensor, such as a piezoelectric element, which senses movement of helmet 10. If no movement of helmet 10 is detected for a predetermined time, such as 5 minutes, then illumination indicator 14 is switched to shutdown mode. In such an arrangement, the active life of a power source used to power illumination indicator 14, such as a battery (not shown), may be significantly lengthened.

30 Illumination indicator 14 and/or braking sensor 14 may be energized by a power source 27, such as primary or rechargeable batteries, preferably rechargeable by the vehicle electrical system or energized by wired connection from the vehicle electrical system with a

quick release connector, or other power sources such as a solar generator or piezoelectric generator.

Reference is now made to Fig. 2 which is a simplified flow chart of braking sensors used with the helmet of Fig. 1.

Braking sensor 20 may include an accelerometer which upon detecting a deceleration of a predetermined threshold activates illumination indicator 14. The deceleration may be that of the vehicle, in which case braking sensor 20 is preferably mounted on vehicle 10. Alternatively, the deceleration of the rider may be sensed, in which case braking sensor 20 is preferably mounted on helmet 10.

Alternatively or additionally, braking sensor 20 may include an electrical current detector which upon detecting a current in the braking electrical wires of vehicle 10 activates illumination indicator 14.

Alternatively or additionally, braking sensor 20 may include a sensor that senses an abrupt reduction of fuel flow to a motor of the vehicle and thereupon activates illumination indicator 14. Such a sensor may be an ABW (Advanced Brake Warning) sensor, described in United States Patent 5,387,898, the disclosure of which is incorporated herein by reference, and commercially available from BARAN Advanced Technologies (86) Ltd., P.O. Box 3005, Industrial Park, Omer, Israel.

Another example of such a sensor that senses an abrupt reduction of fuel flow to a motor of the vehicle is now described with reference to Fig. 3. A pair of sensors 30 and 32 may be provide which are disposed along a fuel cable 34. Fuel cable 34 is advanced in the direction of an arrow 36 to accelerate the vehicle (not shown) and is moved in the direction of an arrow 38 to decelerate the vehicle. If sensor 30 or 32 senses movement of fuel cable 34 in the direction of arrow 36, illumination indicator 14 is not illuminated. However, if sensor 30 or 32 senses movement of fuel cable 34 in the direction of arrow 38, illumination indicator 14 is illuminated.

Alternatively or additionally, braking sensor 20 may include a pressure sensor that senses a fluid pressure of brake fluid in a brake line of the vehicle, and upon detecting a pressure of a predetermined threshold, activates illumination indicator 14.

Alternatively or additionally, braking sensor 20 may include a sensor that senses a movement of a brake cable that actuates a brake of the vehicle and thereupon activates illumination indicator 14. Such a sensor may be particularly useful in vehicles with brake cables, such as bicycles.

A microprocessor may be provided to process signals emitted by any of the braking sensors.

It is appreciated that various features of the invention which are, for clarity, described in the contexts of separate embodiments may also be provided in combination in a single embodiment. Conversely, various features of the invention which are, for brevity, described in the context of a single embodiment may also be provided separately or in any suitable subcombination.

It will be appreciated by persons skilled in the art that the present invention is not limited by what has been particularly shown and described hereinabove. Rather the scope of the present invention is defined only by the claims which follow:

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C L A I M S

What is claimed is:

1. A helmet comprising:
an illumination indicator attached thereto; and
5 a braking sensor that detects a deceleration of a vehicle independently of illumination of a brake light of said vehicle and activates said illumination indicator upon detection of said deceleration of said vehicle.
2. A helmet according to claim 1 and comprising a transmitter for transmitting an
10 activation signal to said illumination indicator.
3. A helmet according to claim 1 or claim 2 wherein said braking sensor comprises an accelerometer which upon detecting a vehicle deceleration of a predetermined threshold activates said illumination indicator.
- 15 4. A helmet according to claim 1 or claim 2 wherein said braking sensor is mounted on said vehicle.
5. A helmet according to claim 1 or claim 2 wherein said braking sensor is mounted on said helmet.
6. A helmet according to claim 1 or claim 2 wherein said braking sensor comprises
20 an electrical current detector which upon detecting a current in said braking electrical wires of said vehicle activates said illumination indicator.
7. A helmet according to claim 1 or claim 2 wherein said braking sensor comprises a sensor that senses an abrupt reduction of fuel flow to a motor of said vehicle and upon detecting such a reduction activates said illumination indicator.
- 25 8. A helmet according to claim 1 or claim 2 wherein said braking sensor comprises a pressure sensor that senses a fluid pressure of brake fluid in a brake line of said vehicle, and upon detecting a pressure of a predetermined threshold activates said illumination indicator.
9. A helmet according to claim 1 or claim 2 wherein said braking sensor comprises a sensor that senses a movement of a brake cable that actuates a brake of said vehicle, and
30 upon detecting such a movement activates said illumination indicator.
10. A helmet according to claim 1 or claim 2 and comprising a microprocessor that processes signals emitted by said braking sensor.

11. A helmet according to claim 1 or claim 2 wherein said illumination indicator is built into said helmet.

12. A helmet according to claim 1 or claim 2 wherein said illumination indicator is an add-on accessory which is attachable to said helmet.

13. A helmet according to claim 1 or claim 2 wherein said braking sensor is electrically connected to an electrical system of said vehicle.

14. A helmet according to claim 1 or claim 2 wherein at least one of said illumination indicator and said braking sensor is energized by a power source selected from the group consisting of: a primary battery, a rechargeable battery, a battery rechargeable by a vehicle electrical system, a battery energized by connection to a vehicle electrical system, a solar generator and a piezoelectric generator.

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15. A helmet according to claim 1 or claim 2 and comprising a switching system for switching said illumination indicator between an active and a shutdown mode.

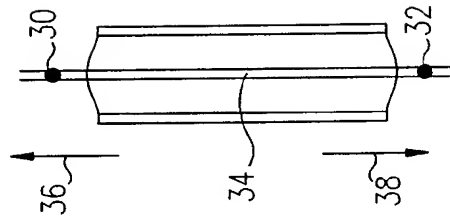
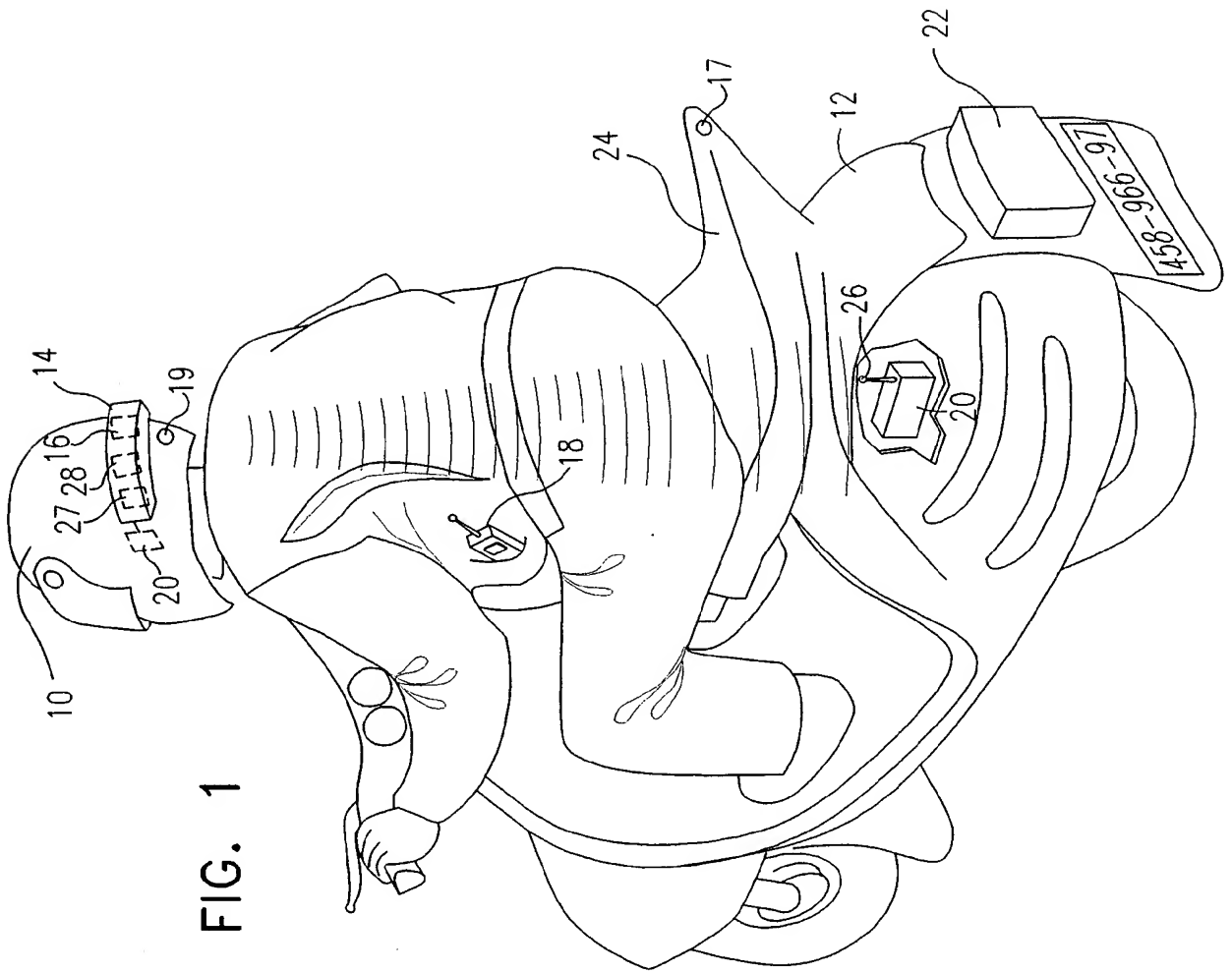
16. A helmet according to claim 15 wherein said switching system comprises an inertial sensor which senses movement of said helmet, wherein if no movement of said helmet is detected for a predetermined time, then said illumination indicator is switched to shutdown mode.

17. A helmet according to claim 1 or claim 2 and comprising an audible alarm.

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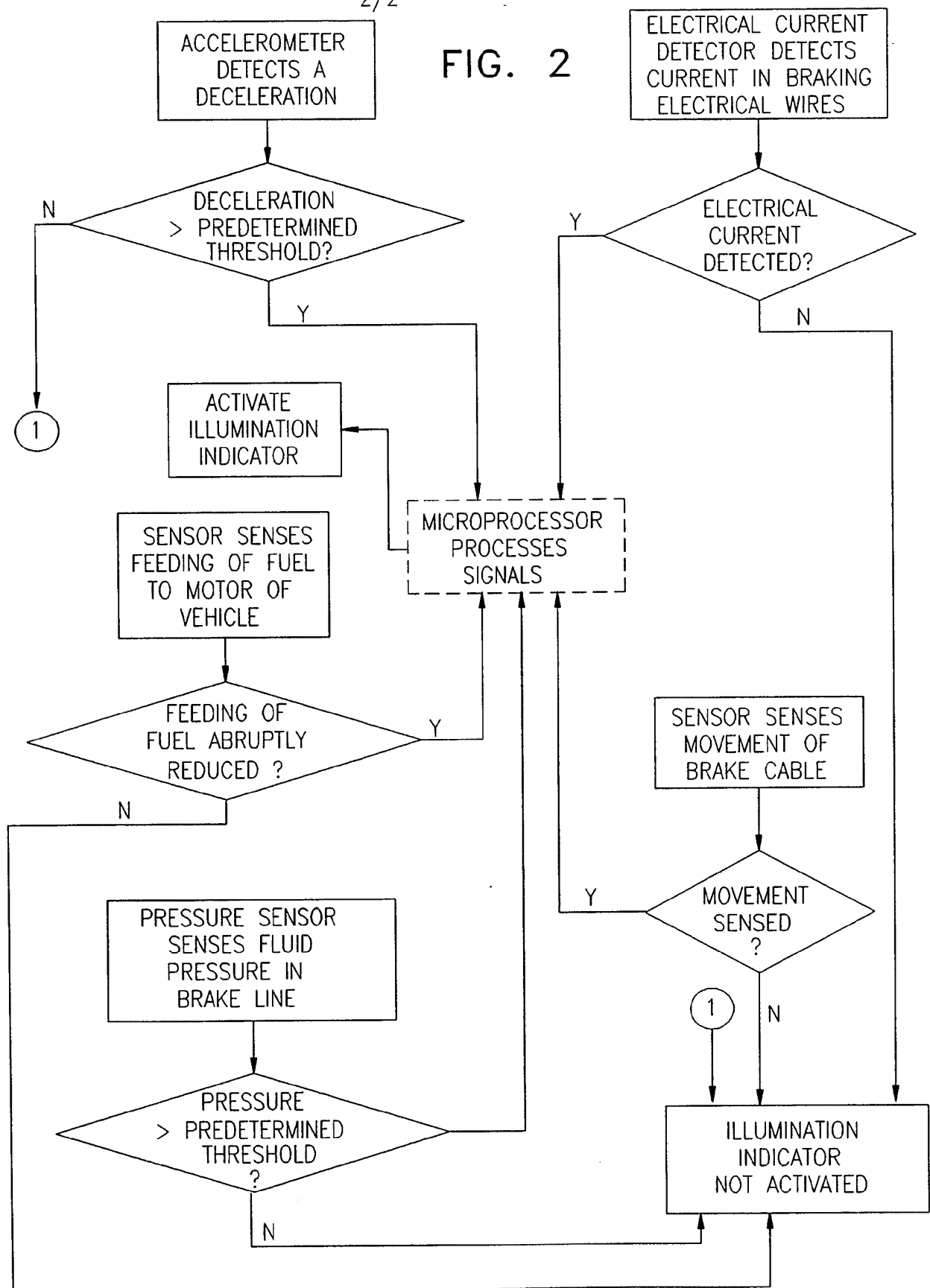
18. A helmet according to claim 17 wherein said audible alarm is activated by a remote control signal.

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FIG. 2



INTERNATIONAL SEARCH REPORT

International application No.
PCT/IL97/00225

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :F21L 15/14

US CL :362/72, 105, 106

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 362/72, 103, 105, 106, 276, 802

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,769,629 A (TIGWELL) 06 September 1988, cols. 1 & 2.	1- 5, 11-14, 17, 18
Y	US 3,142,833 A (BOSLEY et al) 28 July 1964, cols. 1 & 2.	17, 18
Y	US 4,956,752 A (FOGLIETTI) 11 September 1990, cols. 3-5.	2, 9, 10
Y	US 4,901,210 A (HANABUSA) 13 February 1990, cols. 5 & 6.	12

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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